MEADOWBROOK HIGH SCHOOL

PHYSICS SYLLABUS FOR GRADE 9

YEAR 2019-2020

Rationale:

The grade 9 syllabus aims to introduce students to some basic concerns in the subject area as well as to provide a strong and intensive foundation for the CSEC physics syllabus.

The course has strong reliance on mathematical and reasoning skills and hence, provides opportunities for strengthening these areas.

Some of the concepts would have covered a satisfactory amount of objectives on the CSEC Physics syllabus, therefore, re-iteration of what would have been covered in grade nine would not be done in grade 10. The course will also form a part of the grade 9 Diagnostic Test administered by E-Learning Jamaica LTD at the end of the year.

At the end of the course students should have a further exposure to what they really intend to pursue as a profession and what to expect if they were to choose this course as one of his/her subjects at the CSEC level.

TERM 1

Specific Objective

SECTION A – PHYSICAL MEASUREMENTS AND UNITS

(A) Fundamental quantities and Units (6 sessions)

Students should be able to:

1. Recall the fundamental quantities of the System International (S.I. system) and their related symbols;
   - Mass, m; Length, l; Time, t; current, I; Temperature, T
2. Recall that a physical quantity is usually expressed as the product of a number and a unit;
3. Recall the base units for fundamental quantities in the S.I. system and their related symbols;
   - Kilogram, (Kg); metre, (m); ampere, (A); second, (s); Kelvin, (K)
4. Explain the need for, and importance of, standard units in measurements;
   (Teacher may discuss some of the non-standards units which are used)
5. Recall the laws of indices.

(B) Derived Units (2 sessions)

6. Recall that derived quantities and their units are produced by multiplying and dividing fundamental quantities and their units
7. Express derived units using index notation;
   - Most examples should involve only two base units (ms^{-1}, kgm^{-3}, etc.)

(C) Scientific notation (2 sessions)

8. Express a measurement to a certain number of significant figures.
9. Use numbers expressed in standard form
   - Conversion to and from standard from

(D) Prefixes (1 session)

10. Express standard units using prefixes or their symbols;
    - Giga (G); mega (M);…

(E) Conversions **(4 sessions)**

11. Convert from one standard unit to another (example cm to m)
12. Convert from square sub-multiples into multiple units and vice versa (example m^2 to cm^2).
13. Convert from cubic sub-multiples into multiple units and vice versa (example m^3 to cm^3).

(F) Area

14 Measure the area of both regular and irregular shape.
15 Measure the Volume of both regular and irregular solid.

(G) Density **(6 sessions)**

16. Define density.
17. Determine the density using the formula $\rho = \frac{m}{v}$
18. Convert density in g/cm^3 to kg/m^3.
19. Find experimentally the density of a regular solid.
20. Find experimentally the density of an irregular solid by displacement method.
21. Define relative density.
22. Identify relative density as a quantity with no units.
23. Calculate relative density for different materials.
24. Discuss the significance of relative density in relation to flotation.

TERM 2

(H) Graphs **(6 sessions)**

25. Plot and use graphs of experimental data.
26. Draw a line of 'best fit' for a set of plotted values.
27. Determine the gradient and intercept of a straight line graph.

SECTION B – MECHANICS (Term 1 cont'd)

(A) Forces **(4 sessions)**

1. Recall that a force can cause a change in size, shape or motion of a body;
2. Define the unit of force, Newton.
3. Identify situations in which electric, magnetic nuclear or gravitational forces act.
4. Explain the importance of gravitational force.

5. Determine the weight of objects using the relationship: W= m x g;
6. Determine between mass and weight.

TERM 3

(B) Energy (6 sessions)

7. Identify various forms of energy: *gravitational, chemical, electrical, magnetic, thermal, nuclear, sound, elastic etc.*
8. Describe the energy transformations in a given situation;
   (Transformation limited to one or two steps only)
9. State the law of conservation of energy and apply in common situations.
10. Define the potential as the energy stored by an object by virtue of its position or state.
11. Give everyday examples of potential energy like a battery, stretched spring or elastic band, object on a shelf;
12. Calculate the gravitational potential energy using the expression, $E_p = mgh$.
13. Define kinetic energy as the energy possessed by a body by virtue of its motion.
14. Calculate kinetic energies using the expression: $E_k = \frac{1}{2}mv^2$

SECTION C – THERMAL PHYSICS

(A) Transfer of Thermal Energy (4 sessions)

1. Define conduction
2. Explain transfer of thermal energy by conduction
3. Recall good conductors and bad conductors of heat
4. Define convection
5. Explain the transfer of thermal energy by convection
6. Explain the formation of land and sea breezes
7. Define radiation
8. Explain the transfer of thermal energy by radiation